

Physically Active Learning (PAL) - Literature Review

Introduction

Physically Active Learning (PAL) including such activities as learning times tables whilst running, skipping or undertaking circuits is becoming a popular way in primary education to achieve results in subject areas such as maths and English. Children who take part in physical activity whilst learning have been found to increase their academic performance, say The National Centre for Sport & Exercise Medicine (NCSEM) at Loughborough University who started the PAL campaign¹. They state that improvements to engagement, behaviour and concentration within the classroom have also been found and are currently undertaking a year-long study² to examine the effects of PAL within the classroom.

The government's childhood obesity plan 2017³ advises that '*active lessons*' (among other recommendations) be incorporated into everyday life at schools. This recommendation, and the emergence of activity-based learning, comes at a time when children are spending six hours a day on screens⁴ while the number of children walking to school is decreasing⁵ year on year. Findings also show that children spend 50-70% of their time after school sat still⁶, while the Loughborough University research paper found that 70% of children's time at school is spent sitting down².

The NCSEM and other advocates of PAL want to combat the problem of inactivity within the education system by focussing on getting children out of their seats and moving around. Thus, the campaign offers resources that allow teachers to tailor their movement-based learning from classroom-based activities to more vigorous exercise outside.

Supporters of the PAL programme highlights how good health habits formed in childhood will remain through to adulthood. Therefore, in theory helping to combat instances of heart disease etc occurring later in life. Since children spend the majority of their time in school, it would appear beneficial to incorporate simultaneous learning and exercise to improve academic results and overall health while not forfeiting academic learning time.

How is PAL used?

The PAL website offers ways that teachers can implement Movement Integration (MI) in to their schools. There are various exercises where classes do not need to leave the room and cover subjects such as maths and literacy. Asking children to make the shape of a capital letter or make an exclamation mark by jumping followed by a punch are example resources on the PAL website. Other exercises involve children dancing around the classroom and then performing a certain dance move when a prime number is called. While the Tagtiv8 game⁷ is a more energetic form of exercise, allowing children to play a version of tag rugby outside whilst solving maths problems. Research trials used more high intensity activities, requesting children to take part in obstacle courses and relay races.

What is the research?

Trials have been conducted around the world on primary school aged children, analysing whether there is any evidence to support the claims. An Australian study⁸ gave a group of children exercise for twenty minutes, three times a week for six weeks while simultaneously teaching them times tables. A control group was also used who were learning the same information but remained seated. The conclusion found both groups similarly improved in times tables, yet the active children improved in their general numeracy skills. There was little change in the aerobic fitness in the physically active children, while their body mass index remained the same. Teacher feedback reported that usually restless children settled faster in the classroom after the exercise. Other studies support these findings. A Norwegian article⁹ conducted a similar study but over the course of seven months and concluded with comparable results but did note that combining activity with learning stimulated the academically weaker children. While trials in the Netherlands¹⁰ and America¹¹ monitored a child's 'time-on-task' post physical activity and found that concentration levels increased following a period of vigorous exercise. They suggest that conducting exercise before class may be a creative way to increase a child's engagement level in the classroom.

However, a journal article¹² reviewed eleven studies that looked at the effects of PAL on school children. The review found that while these studies found evidence to show improvements in educational outcomes following physical activity, the report concluded that there are still too few studies to draw a firm conclusion and that

further extensive research is required. This conclusion is also mentioned in the Norwegian study and they advise that there is still not enough research to confirm the claims that an increase in physical activity sees an improvement in academic work.

Though there is much support for the implementation of activity-based learning from governments and other communities, teachers still have the responsibility to use the programme themselves and so may feel pressured and have concerns of their own. Following their PAL initiative, The Loughborough University undertook a research project¹³ to better understand teacher perceptions on the delivery and implementation of the PAL programme. Various themes arose from the discussions, predominantly that teachers felt that the whole school needs to be on board, including senior. They felt that if the odd teacher undertook PAL, they would not be supported or encouraged by management, since it is not an official school policy.

Another highlighted complaint was that teachers do not have time to both plan and then deliver PAL alongside their routine day to day planning. Other considerations included time restraints, confidence in delivery and judgements and expectations from external sources such as Ofsted and parents. Teachers were also concerned about the pupil's approach, including behavioural management, to the programme. report finalises that the concerns teachers have are valid and further considerations (such as extensive teacher training, support of PAL planning and leadership from the top down) should be paid to them when future PAL campaigns are rolled out.

Conclusion

Whilst it is hard to argue against children receiving more exercise to reverse the obesity epidemic in the UK, the combination of learning whilst exercising is still open to debate. Supporters point to research that back their claims and implementing a MI based learning system would appear to be the logical step forward. But studies in the area show little to small improvements in children's academic results¹⁴ and this would be a concern for education facilities and staff. Schools may be reluctant to incorporate a MI based learning system as based on research, academic results may drop.

If a PAL based programme were to be rolled out to schools, extensive planning, support and communication would be required. Sufficient staff training would be essential and senior management would need to be committed to support and encourage teachers.

Reports conclude that further research is needed before any decisions are made in relation to activity-based learning. Daily exercise offers many health benefits and encouraging children to be active day to day should not be deterred.

¹ <http://classpal.org.uk/>

² <https://www.gov.uk/government/publications/childhood-obesity-a-plan-for-action/childhood-obesity-a-plan-for-action>

³ [Study design and protocol for a mixed methods evaluation of an intervention to reduce and break up sitting time in primary school classrooms in the UK: The CLASS PAL \(Physically Active Learning\) Programme. Ash C Routen, Stuart J H Biddle, Danielle H Bodicoat, Lorraine Cale, Stacy Clemes, Charlotte L Edwardson, Cris Glazebrook, Deirdre M Harrington, Kamlesh Khunti, Natalie Pearson, Jo Salmon, Lauren B Sherar](#)

⁴ <https://www.bbc.co.uk/news/technology-32067158>

⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/476635/travel-to-school.pdf

⁶ <http://www.ncsem-em.org.uk/project/physically-active-learning-in-schools/>

⁷ <https://tagtiv8.com/>

⁸ [Learning “Math on the Move”: Effectiveness of a Combined Numeracy and Physical Activity Program for Primary School Children Melanie Vetter, Helen O’Connor, Nicholas O’Dwyer, and Rhonda Orr](#)

⁹ [Effects of physical activity on schoolchildren’s academic performance: The Active Smarter Kids \(ASK\) cluster-randomized controlled trial](#)

[Geir K. Resaland a, Eivind Aadland a, Vegard Fusche Moe a, Katrine N. Aadland a, Turid Skrede a, Mette Stavnsbo a, Laura Suominena, Jostein Steene-Johannessen a, Øyvind Glosvik a, John R. Andersen b,c, Olav M. Kvalheim b,d, Gunn Engelsrud a,e, Lars B. Andersen a,e, Ingar M. Holme e, Yngvar Ommundsenf, Susi Kriemler g, WillemvanMechelenh, Heather A. McKay i, Ulf Ekelund e, Sigmund A. Anderssen a,e](#)

¹⁰ [Moderate-to-vigorous physically active academic lessons and academic engagement in children with and without a social disadvantage: a within subject experimental design](#)

[Marijke J. Mullender-Wijnsma Esther Hartman Johannes W. de Greeff Roel J. Bosker Simone Doolaard Chris Visscher](#)

¹¹ [Active learning improves on-task behaviors in 4th grade children](#)

[J.B. Bartholomewa, N.M. Golaszewskia, E. Jowersa, E. Korineka, G. Robertsb, A. Fallb, S. Vaughnb](#)

¹² [Physically active lessons as physical activity and educational interventions: A systematic review of methods and results](#)

[E. Norris a, N. Sheltona, S. Dunsmuir b, O. Duke-Williams c, E. Stamatakis](#)

¹³ [Teacher perceptions on the delivery and implementation of movement integration strategies: The CLASS PAL \(Physically Active Learning\) Programme](#)

[A.C. Routena, J.P. Johnstonb, C. Glazebrookc, L.B. Sherara](#)

¹⁴ [Systematic review of acute physically active learning and classroom movement breaks on children’s physical activity, cognition, academic performance and classroom behaviour: understanding critical design features](#)

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